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| 10/653,192 | 09/03/2003 | Hyeong-Gon Noh | 1567.1053 | 1737 |
| 49455 | 7590 | 08/03/2006 | EXAMINER | |
| STEIN, MCEWEN & BUI, LLP 1400 EYE STREET, NW SUITE 300 WASHINGTON, DC 20005 | | | WEINER, LAURA S | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1745 | |

DATE MAILED: 08/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/653,192

Applicant(s)

NOH ET AL.

Examiner

Laura S. Weiner

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 June 2006.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-63 is/are pending in the application.
- 4a) Of the above claim(s) 13-16, 23-28, 31 and 43-63 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7-12, 17-20, 29, 30, 32-35, 38 and 40-42 is/are rejected.
- 7) ☒ Claim(s) 5, 6, 21, 22, 36, 37 and 39 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 6-19-06 have been fully considered but they are not persuasive. The rejection of claims 1-4, 7-8, 38, 40-42 remain rejected under 35 U.S.C. 102(b) as being anticipated by Arai et al. (JP 10-189043, abstract) because Arai et al. teaches a battery comprising a nonaqueous solvent composed of 5-40 wt% of a chain carbonate and a mono-halogenated cyclic carbonate expressed by formula I where X1 to X4 are F, Cl, Br and H. Arai et al. teaches that the electrolyte comprises LiPF₆, LiBF₄, etc. Therefore teaching an electrolyte comprising lithium salts, an organic solvent (chain carbonate) and a carbonate-based additive compound having substituents selected from a halogen (this mono-halogenated cyclic carbonate compound is expressed by formula I where X1 to X4 are F, Cl, Br).

The rejection of claims 1-4, 7-12, 17-20, 29-30, 32-35 under 35 U.S.C. 103(a) as being unpatentable over Xu et al. (6,743,947) in view of Arai et al. (6,495,293) remains because Xu et al. teaches that the electrolytic solvent is selected from the group of nonaqueous aprotic compounds consisting of AN, ADN, butylene carbonate, diethylcarbonate, dimethylcarbonate, ethylmethylcarbonate, ethylene carbonate, propylene carbonate, fluoroethylene carbonate, difluoroethylene carbonate, dialkylsulfone (R-SO₂-R'), etc. and teaches that the electrolytic solvent is a mixture of two or more of the solvents. Therefore teaching an electrolyte comprising an organic solvent (AN, ADN, butylene carbonate, diethylcarbonate, dimethylcarbonate, ethylmethylcarbonate, ethylene carbonate, propylene carbonate) and a carbonate-

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based additive compound having substituents selected from a halogen (fluoroethylene carbonate, difluoroethylene carbonate, etc.). Arai et al. teaches a nonaqueous electrolyte comprising a fluorinated solvent where if a lithium salt is used, the electrolyte can be used as the electrolyte for a lithium battery and if a quaternary onium salt is used, the electrolyte can be used as an electrolyte for electrochemical capacitors. Arai et al. teaches in column 4, that the lithium salt for a lithium battery can be LiPF₆, LiBF₄, etc.

The rejection of claims 1-12, 38-42 under 35 U.S.C. 102(e) as being anticipated by Sato et al. (US 2004/0146786) has been withdrawn because translations of the priority documents have been received.

Election/Restrictions

2. Applicant's election with traverse of Group I, claims 1-28, 38-42 in the reply filed on 12-21-05 is acknowledged. Also, Group II, claims 29-37 has been combined because the claims are drawn to the elected species. Therefore claims 43-63 are withdrawn. In regard to claims 13-16 and 23-28, 31, these claims are still in the case but are withdrawn currently because they do not disclose the currently elected species of a carbonate-based additive compound having an halogen substituent where the electrolyte further comprises a methyl sulfone (*cannot be a vinyl sulfone because an alkenyl group cited in claim 17; C2-C4 alkenyl group of claim 18 and a halogen-substituted alkenyl group of claim 19 was not chosen*), an organic sulfone-based compound of formula (3) (claims 1-12, 17-22) where R₁ and R₂ are a primary,

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secondary or tertiary alkyl group and more specifically C1-C4 alkyl and more specifically an halogen-substituted alkyl group.

Therefore, claims 13-14 are withdrawn because they contain an electrolyte further comprising an organic solvent with a low boiling point; claims 15-16 are withdrawn because they contain an electrolyte further comprising an aromatic hydrocarbon organic solvent; claims 23-26 are withdrawn because they contain an electrolyte further comprising a compound of formula (4); claims 27-28 are withdrawn because they contain an electrolyte further comprising a swelling-inhibiting additive and claim 31 requires R1 or R2 of the sulfone-based compound to be a vinyl.

The requirement is still deemed proper and is therefore made FINAL.

3. Claims 13-16, 23-28, 31, 43-63 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention and species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 12-21-05.

Claim Rejections - 35 USC § 102

4. Claims 1-4, 7-8, 38, 40-42 are rejected under 35 U.S.C. 102(b) as being anticipated by Arai et al. (JP 10-189043, abstract).

Arai et al. teaches a battery comprising a nonaqueous solvent composed of 5-40 wt% of a chain carbonate and a mono-halogenated cyclic carbonate expressed by formula I where X1 to X4 are F, Cl, Br and H. Arai et al. teaches on page 2 of the

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patent that the electrolyte comprises LiPF₆, LiBF₄, etc. Arai et al. teaches on page 7 of the patent that the electrolyte comprises DMC (bp = 91 degrees C). Arai et al. teaches that the positive electrode comprises LiCoO₂ and the negative electrode comprises graphite..

Claim Rejections - 35 USC § 103

5. Claims 1-4, 7-12, 17-20, 29-30, 32-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al. (6,743,947) in view of Arai et al. (6,495,293).

Xu et al. teaches in columns 13-14, claim 4, that the electrolytic solvent is selected from the group of nonaqueous aprotic compounds consisting of AN, ADN, butylene carbonate, diethylcarbonate, dimethylcarbonate, ethylmethylcarbonate, ethylene carbonate, propylene carbonate fluoroethylene carbonate, difluoroethylene carbonate, dialkylsulfone (R-SO₂-R'), etc. and teaches in claim 5, that the electrolytic solvent is a mixture of two or more of the solvents of claim 4.

Xu et al. teaches the claimed invention as explained above teaching that the electrolyte salt is an onium salt instead of a lithium salt and does not specifically teach that the electrolyte can comprise butylene carbonate, ethylene carbonate or propylene carbonate as well as difluoroethylene carbonate as well as dialkylsulfone.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use three solvents such as EC, difluoroethylene and dialkylsulfone because Xu et al. teaches that a mixture of two or more solvents is known and because it is prima facie obvious to combine two compositions each of which is

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taught by prior art to be useful for the same purpose in order to form a third composition that is to be used for the very same purpose. See *In re Kerkhoven*, 205 USPQ 1069; *In re Susi*, 169 USPQ 423.

Arai et al. teaches in column 2, lines 15-42, a nonaqueous electrolyte comprising a fluorinated solvent where if a lithium salt is used, the electrolyte can be used as the electrolyte for a lithium battery and if a quaternary onium salt is used, the electrolyte can be used as an electrolyte for electrochemical capacitors. Arai et al. teaches in column 4, that the lithium salt for a lithium battery can be LiPF₆, LiBF₄, etc.

It would have been obvious to one having ordinary skill in the art at the time the invention was made use a lithium salt instead of an onium salt when the electrochemical cell is a lithium battery because Arai teaches that if a lithium salt is used, the electrolyte can be used as the electrolyte for a lithium battery and if a quaternary onium salt is used, the electrolyte can be used as an electrolyte for electrochemical capacitors.

Allowable Subject Matter

6.. Claims 5-6, 21-22, 36-37, 39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

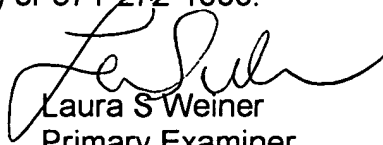
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura S. Weiner whose telephone number is 571-272-1294. The examiner can normally be reached on M-F (6:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Laura S. Weiner
Primary Examiner
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July 25, 2006